Stimulation of Axillary Shoot Development of Cordyline terminalis ‘Celestine Queen’ by Foliar Sprays of 6-Benzylamino purine

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Abstract. Multiple axillary shoots were obtained from Cordyline terminalis L. ‘Celestine Queen’, treated once weekly for 8 weeks with 6-benzylamino purine (BA) from 100 to 500 mg/liter. At 250–500 mg/liter, 78% and 100% of the propagules of the chimeral clones were true-to-type.

The classical method of propagating cordyline (ti) is by small (± 1 cm) cuttings obtained from the rhizome. In order to harvest enough propagation material plants are grown in beds containing a mixture of leaf-mold and peat until a few weeks before they are salable; the rhizomes are harvested and serve as new propagation material while the mature plants are potted. This propagating procedure is rather labor intensive and some new cultivars have recently been introduced into production which do not develop a large rhizome. Thus, some growers plant directly in the final pot using tissue culture-derived plants (2, 4, 5, 6). A difficulty with direct pot culture of cordyline is that those species and cultivars which develop a strong rhizome are pushed out of the pot as the rhizome lengthens. Investigations are underway to find appropriate cultural conditions which minimize the development of the rhizome.

Cytokinins are known to release intact plants from correlative inhibition (10, 11, 12). Sachs and Thimm (9) demonstrated that kinetin, applied locally to the axillary buds of Coleus, Helianthus, and Scabiosa, stimulated elongation. Method of application, type of cytokinin, concentration, and duration of treatment were important. Outgrowth of axillary buds of Pinus silvestris could be achieved with 225 mg/liter BA applied biweekly during a few months (3). Cohen (1) showed that a single application of 500–1000 ppm BA resulted in axillary bud development in Pinus strobus after 8 weeks. Richards (8) noted that only repeated foliar BA sprays promoted bud outgrowth of apple.

‘Celestine Queen’ cordyline is a green-yellow chimerat cultivar. Attempts to propagate this plant commercially in vitro failed because of the instability of the plant; the yellow color can be absent even on media which stimulate the development of axillary shoots. Absence of yellow color also occurs occasionally in vitro. Tissue culture propagation is a good alternative for the propagation of non-chimeral cordyline (and dracaena) but not for chimeral ones, but an alternative way of enhancing the propagation of chimeral clones is required.

‘Celestine Queen’ plants were obtained from root cuttings and grown in a greenhouse gate this plant commercially but for the propagation of non-chimeral cordyline (and dracaena) but not for chimeral ones, but an alternative way of enhancing the propagation of chimeral clones is required.

‘Celestine Queen’ plants were obtained from root cuttings and grown in a greenhouse at a constant temperature of 25°C and 80% humidity. From October until the end of March they received additional light provided by Philips HP/T 400 W lamps to provide a 16 hr daylength. The stems of the plants were about 15 cm high at the start of the weekly BA sprays. BA was dissolved in 1% dimethylsulfoxide (DMSO) and the treatment continued for 8 weeks. The control plants were sprayed with 1% DMSO. Each treatment consisted of 5 uniform plants and BA was applied with a 1 liter plastic hand sprayer until run-off.

Eighteen weeks after the last cytokinin application the elongation of most new developed shoots was arrested in favor of a few dominating shoots (Table 1). Only shoots ≥ 2.5 cm were harvested because we have demonstrated this to be the minimum length for successful rooting of tissue cultured plants of cordyline (results not presented). Shoots were rooted by planting in rockwool saturated with a solution of 2 mg/liter indolebutyric acid in water, as described earlier (2). Data on shoot formation, elongation, rooting and finally percentage of true-to-type plants are presented in Table 1. Fig. 1 shows a plant treated with 8 applications of 250 mg/liter BA, just before the harvest and Fig. 2 gives an impression of the mean number of shoots that can be obtained.

BA concentration has a drastic effect on true-to-type propagation and rootability: with 500 mg/liter both characteristics represent less than 50%; with the lowest dose (100 mg/liter) true-totype reached 100% but the propagation was too low. Only the results obtained with 250 mg/liter BA are acceptable.

Table 1. Effect of BA treatments applied 8 consecutive weeks on adventitious or axillary shoot production of ‘Celestine Queen’ cordyline. Data refers only to shoots ≥ 2.5 cm.

<table>
<thead>
<tr>
<th>BA concn (mg/liter)</th>
<th>Mean no. adventitious shoots</th>
<th>Mean length of the harvested shoots (cm)</th>
<th>Rooting (%)</th>
<th>Plants true-to-type (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>35 a</td>
<td>2.3 b</td>
<td>48 c</td>
<td>45 c</td>
</tr>
<tr>
<td>250</td>
<td>25 a</td>
<td>3.4 b</td>
<td>86 b</td>
<td>78 b</td>
</tr>
<tr>
<td>100</td>
<td>7 b</td>
<td>4.0 a</td>
<td>100 a</td>
<td>100 a</td>
</tr>
<tr>
<td>0</td>
<td>0 c</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

*Means separation in columns by Duncan’s multiple range test, 5% level.*

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Fig. 1. ‘Celestine Queen’ cordyline 12 weeks after the last treatment with BA at 250 mg/liter.
Influence of Cultural Practices on Postharvest Interior Performance of Two Species of Schefflera

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Abstract. Plant growth and quality were determined for 2 species of schefflera grown under 3 production light levels and 2 fertilizer treatments. High production light (828 μE m⁻² s⁻¹) resulted in better growth of Brassia actinophylla Endl. but generally had no effect on the growth parameters of Schefflera arboricola Hayata ex. Kanehira. Increasing fertilizer levels decreased plant growth and quality for S. arboricola in the production phase but caused no difference for B. actinophylla. However, after 3 months in an interior environment, B. actinophylla produced under the highest light level and S. arboricola produced under the lowest light level (276 μE m⁻² s⁻¹) maintained better growth and plant quality. Both species receiving the lowest fertilizer treatment (200 mg N/pot-week) were better in growth and quality after 3 months indoors in contrast to the highest fertilizer treatment (400 mg N/pot-week).

Two species of schefflera are widely used in the interior plantscape. B. actinophylla is a larger growing species in contrast to S. arboricola, a dwarf species with smaller leaflets and a more compact growth habit. S. arboricola has been shown to be extremely shade tolerant (5). The production of an adequately acclimatized foliage plant requires a balance of reduced light and proper nutrition for the particular species. Studies (2, 3, 4, 7) have shown that a reduction of light during production will reduce the light compensation point (LCP) of foliage plants, therefore conditioning them for placement indoors. However, increased fertilizer rates cause an increase in the LCP which offsets the benefits gained by producing the plants under reduced light. Since shade-tolerant plants usually have a lower LCP (6), fertilizer rates should be reduced to achieve the proper light and fertilizer ratio. The objectives of this research were to determine the effects of production light and fertilizer levels on growth, chlorophyll content, and quality of two schefflera species following production and after three months in an interior environment.

A 3 x 2 factorial experiment in a randomized complete block design was initiated on Dec. 3, 1979, with B. actinophylla and S. arboricola to test 3 production light levels and 2 fertilizer levels. Production light levels in the greenhouse were 828, 414, and 276 μE m⁻² s⁻¹ (maximum light) established with synthetic active radiation (PAR). Soluble fertilizer 20N–8.8P–16.6K was applied at the rates of 200 or 400 mg N/pot-week using a standard volume of 200 mg/pot and application was terminated 1 month prior to the end of production. Treatments were replicated 5 times with 1 plant per pot as an experimental unit. The production phase (Phase I) of the experiment was terminated May 3, 1980. Experimental units were then moved to an interior environment where they were held for 3 months in an interior holding phase (Phase II).

Literature Cited